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# **Guidance on Practice for In Service Inspection and Testing of Above Ground Atmospheric and Low Pressure Storage Tanks**

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**GP 32-44**

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**BP GROUP  
ENGINEERING TECHNICAL PRACTICES**

## Foreword

This is the first issue of Engineering Technical Practice (ETP) BP GP 32-44. This Guidance on Practice (GP) is based on parts of heritage documents from the merged BP companies as follows:

### British Petroleum

RP 32-4 Inspection & Testing of In-Service Civil and Mechanical Plant - Technical Guidance, Section B.5.

### BPOUS RPs

RP 11-1-1 IC Atmospheric Storage Tanks Inspection Checklist.

RP 11-1-3-IC Tank Roof Seal Inspection Checklist.

RP 11-1-5 Tank Inspection, Repair, Alteration and Reconstruction.

RP 11-2-1 IC Low Pressure Storage Tank Inspection Checklist.

### Amoco

A FE-TK-653-S Fabricated Equipment—Tanks—API 653 Tank Inspection, Repair, Alteration, and Reconstruction—Specification.

A FE-TK-CKLT-I Fabricated Equipment—Tanks—Inspection Activity Checklist—Inspection Form.

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## Table of Contents

|                                                                                       | Page |
|---------------------------------------------------------------------------------------|------|
| 1. Scope .....                                                                        | 4    |
| 2. Normative references.....                                                          | 4    |
| 3. Symbols and abbreviations .....                                                    | 6    |
| 4. Tank inspector certification .....                                                 | 6    |
| 5. Site Technical Practices, inspection plans, procedures, and checklists.....        | 6    |
| 5.1. General.....                                                                     | 6    |
| 5.2. Site Technical Practices.....                                                    | 6    |
| 5.3. Inspection plans and procedures .....                                            | 6    |
| 5.4. Operational surveillance inspections.....                                        | 7    |
| 5.5. Inspecting in service tanks.....                                                 | 7    |
| 5.6. Inspecting out of service tanks.....                                             | 10   |
| 5.7. Hydrotesting.....                                                                | 12   |
| 5.8. Inspection and testing of protective devices and systems .....                   | 12   |
| 6. Inspection and testing frequency.....                                              | 13   |
| 7. Inspection of storage tanks for refrigerated liquefied gases (RLG) .....           | 14   |
| 7.1. Overview of inspection requirements .....                                        | 14   |
| 7.2. External inspections and surveillance .....                                      | 14   |
| 7.3. Internal inspections.....                                                        | 15   |
| 8. Repairs and modifications.....                                                     | 15   |
| 9. Records .....                                                                      | 15   |
| Annex A (Normative) Typical operational inspection checklist for floating roofs ..... | 16   |
| Bibliography .....                                                                    | 17   |

## List of Tables

|                                                                            |    |
|----------------------------------------------------------------------------|----|
| Table 1 - Maximum recommended inspection intervals for storage tanks ..... | 13 |
|----------------------------------------------------------------------------|----|



## 1. Scope

- a. This GP provides specific guidance for in service inspection and testing of vertical cylindrical above ground storage tanks for storage of all types of fluids at atmospheric or low positive pressure and at all temperatures.
- b. This GP applies to tanks that in many cases have been constructed in accordance with API 620, API 650 (as well as its predecessor API 12C), and BS 2654 (superseded by EN 14015).
- c. Tanks constructed to similar codes and specifications are also within scope of this GP.

*Riveted tanks, although no longer constructed, are within scope of this GP for in service inspection.*

- d. The following are excluded from scope of this GP:
  1. Horizontal storage tanks (although same principles apply).
  2. Underground or in-ground atmospheric storage tanks.
  3. Storage vessels designed to pressure vessel codes (e.g., spheres, bullets). Refer GP 32-41.
  4. Mobile storage vessels.
  5. Prestressed concrete vessels (refer to GP 32-46).
  6. Rectangular steel tanks.
  7. In leg storage on fixed offshore production platforms.
  8. Floating storage vessels.
  9. Non metallic storage.
  10. Bolted tank designs.

*If sites own and operate tanks in these excluded categories, specialist advice (including Vendor guidelines) should be sought to develop appropriate inspection and testing procedures.*
- e. Inspection and testing of mechanical protective devices for tanks is described in GP 32-47.
- f. Inspection of tank bund (dike) walls and liners is addressed in GP 32-46.

## 2. Normative references

The following normative documents contain requirements that, through reference in this text, constitute requirements of this technical practice. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this technical practice are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

### BP

|          |                                                                                                  |
|----------|--------------------------------------------------------------------------------------------------|
| GP 32-30 | Guidance on Practice for In Service Inspection and Testing of Equipment - Management Principles. |
| GP 32-40 | Guidance on Practice for In Service Inspection and Testing of Equipment - Common Requirements.   |



|            |                                                                                                          |
|------------|----------------------------------------------------------------------------------------------------------|
| GP 32-41   | Guidance on Practice for In Service Inspection of Unfired Pressure Vessels.                              |
| GP 32-46   | Guidance on Practice for In Service Inspection and Testing of Equipment - Onshore Civil and Structures.  |
| GP 32-47   | Guidance on Practice for In Service Inspection and Testing of Equipment - Mechanical Protective Devices. |
| GIS 58-401 | Guidance on Industry Standard for Tank Inspection, Repair, Alteration, and Reconstruction.               |

*GIS 58-401 specifies BP inspection, repair, alteration, and reconstruction requirements for large welded non refrigerated atmospheric storage tanks with uniformly supported bottoms, such as those built in accordance with API 650 and BS 2654. GIS 58-401 has same scope as API Std 653, third edition with Addendum 1, September 2003, and should be read in conjunction with that API standard.*

### American Petroleum Institute (API)

|              |                                                           |
|--------------|-----------------------------------------------------------|
| API Spec 12C | All-Welded Oil Storage Tanks.                             |
| API RP 575   | Inspection of Atmospheric and Low-Pressure Storage Tanks. |

*API RP 575 covers inspection of atmospheric and low pressure storage tanks that have been in service and describes types of storage tanks and standards for their construction and maintenance. Reasons for inspection, causes of deterioration, frequency and methods of inspection, methods of repair, and preparation of records and reports are covered. API RP 575 is intended to supplement API Std 653, which provides minimum requirements for maintaining integrity of storage tanks after they have been placed in service.*

|             |                                                         |
|-------------|---------------------------------------------------------|
| API Std 653 | Tank Inspection, Repair, Alteration and Reconstruction. |
|-------------|---------------------------------------------------------|

*API 653 covers carbon and low alloy steel tanks built to API 650 and its predecessor API 12C and provides minimum requirements for maintaining integrity of welded or riveted non refrigerated atmospheric pressure above ground storage tanks after they have been placed in service. It covers maintenance, inspection, repair, alteration, relocation, and reconstruction.*

|             |                                                                                                                 |
|-------------|-----------------------------------------------------------------------------------------------------------------|
| API RP 12R1 | Recommended Practice for Setting, Maintenance, Inspection, Operation and Repair of Tanks in Production Service. |
|-------------|-----------------------------------------------------------------------------------------------------------------|

*API 12R1 is intended for application to tanks fabricated to API 12F3, D, F, and P (sometimes called API 12 series) if employed in land production service but its basic principles are applicable to atmospheric tanks of other dimensions and specifications if employed in similar oil and gas production, treating, and processing. It is not applicable to refineries, petrochemical plants, marketing bulk stations, or pipeline storage facilities operated by carriers. Tanks fabricated to API 650 or its predecessor 12C should be maintained in accordance with API 653.*

|         |                                                                                |
|---------|--------------------------------------------------------------------------------|
| API 620 | Rules for Design and Construction of Large, Welded Low-Pressure Storage Tanks. |
| API 650 | Welded Steel Tanks for Oil Storage.                                            |

### British Standards Institute (BS)

|         |                                                                                                                  |
|---------|------------------------------------------------------------------------------------------------------------------|
| BS 2654 | Vertical steel welded storage tanks with butt welded shells for the petroleum industry (superseded by EN 14015). |
|---------|------------------------------------------------------------------------------------------------------------------|



**Engineering Equipment and Materials Users Association (EEMUA)**

EEMUA Publ. 159      Users Guide to the Maintenance and Inspection of Aboveground Vertical Cylindrical Steel Storage Tanks.

*EEMUA 159 sets out key features required for planning and executing inspection, maintenance, and repair on above ground vertical steel storage tanks.*

*Descriptions of key tank components that require inspection or maintenance, degradation mechanisms, and common inspection techniques are followed by sections describing probabilistic (risk and reliability) based preventive maintenance (PPM) concept and for each tank component, detailed description of inspection and repair methods. Guidance is given on sources of additional information that assist both continued operation and inspection.*

*EEMUA 159 mainly addresses atmospheric storage tanks for oil and chemical products (referred to elsewhere in text as “conventional” storage tanks). Tanks for refrigerated storage of liquefied gases are covered in Appendix F.*

**European Standards (EN)**

EN 14015      Specification for the design and manufacture of site built, vertical, cylindrical, flat-bottomed, above ground, welded, steel tanks for the storage of liquids at ambient temperature and above.

**3. Symbols and abbreviations**

For the purpose of this GP, the following symbols and abbreviations apply:

MFL      Magnetic flux leakage testing

RLG      Refrigerated liquefied gas

**4. Tank inspector certification**

Site Technical Authority for storage tanks, Inspection Authority, and/or designated inspector for tanks shall be certified to API Std 653 or EEMUA 159.

*Certification schemes relate to qualification of certified tank inspectors (API) and tank integrity assessors (EEMUA). Term “Authorised Inspector” is sometimes used to indicate inspector certified to API.*

**5. Site Technical Practices, inspection plans, procedures, and checklists****5.1. General**

This GP shall be read and interpreted in conjunction with GP 32-30 and GP 32-40.

**5.2. Site Technical Practices**

- a. This GP shall be adopted, modified, or supplemented by Sites into a Site Technical Practice (STP).
- b. The STP shall be approved by the Site Engineering Authority and form the basis for the development of tank specific inspection plans, procedures, and checklists.

**5.3. Inspection plans and procedures**

- a. Site equipment specific inspection plans and procedures for tanks shall:



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Page 6 of 17